

11. A telecommunication system using wireless transmissions, the system comprising:

a primary station communicating with a first plurality of stations, the primary station including a radio having a receiver and a transmitter wherein:

(i) said transmitter transmits primary station synchronization information including an assignment of n transmission fixed periodic time slots to a plurality of subscriber units of the first plurality of stations, where n is an integer greater than 1, and n reception fixed periodic time slots on a selected frequency, said assignment of time slots resulting in each of said plurality of subscriber units assigned a separable slot;

(ii) said radio transceives a duplex telephonic communication with the first plurality of subscriber units stations on the selected frequency wherein:

(a) said transmitter transmits first speech information in a respective one of the n transmission time slots on the selected frequency; and

(b) said receiver receives second speech information from each of the first plurality of subscriber units stations in one of the n reception time slots on the selected frequency and receiving base station synchronization information from a base station, wherein a transmit and receive timing of the primary station is synchronized to the base station using the base station synchronization information; and

the first plurality of stations including:

the base station communicating with a second plurality of stations, the base station receiving from the primary station the first speech information originated from one of the first plurality of stations a ~~secondary station~~ in said respective transmission time slot and transmitting the second

speech information in said respective reception time slot, the base station transmitting the base station synchronization information; and

each of the subscriber units ~~the secondary station~~ having:

(i) a radio receiver which receives the primary station synchronization information from the primary station and identifies the assignment of time slots and which receives from the primary station the first speech information originating from the base station in said respective transmission time slot, wherein a transmit and receive timing of the secondary station is synchronized to the primary station using the primary station synchronization information; and

(ii) a radio transmitter which transmits the second speech information in said respective reception time slot; and

(iii) each of said plurality of subscriber units ~~secondary stations~~ finds the transmissions and slots assigned to that subscriber unit ~~secondary station~~;

wherein using the primary station for transmissions between the base station and subscriber units ~~secondary station~~ is transparent to the base station and subscriber units ~~secondary station~~, and the primary station and the subscriber units themselves detect ~~secondary station itself detects~~ a frame timing from received signals and aligns its transmitting frame timing accordingly.

²/₁₃. A telecommunication system according to claim ¹/₁₁ wherein said primary station radio transmits an assignment of two transmission and two reception time slots.

³/₁₄. A telecommunication system according to claim ¹/₁₁ wherein the subscriber units are ~~secondary station~~ is positioned outside an operating range of said base station at a remote location whereat direct communication with said base station can not be made.

~~8~~
~~15.~~ A telecommunication station for communicating with a base station and a secondary station using wireless transmissions, the base station communicating with a plurality of stations, the telecommunication station comprising:

a transmitter which:

(i) transmits telecommunication station synchronization information including the assignment of $2n$ fixed periodic time slots to a plurality of subscriber units including the secondary station, where n is an integer greater than 1, on a selected frequency, n fixed periodic transmit time slots for transmission from said telecommunication station and n fixed periodic reception time slots for reception by said telecommunication station, the telecommunication station synchronization information enabling a transmit and receive timing of the secondary station to be synchronized to the telecommunication station, said assignment of time slots resulting in each of said plurality of subscriber units assigned a separable slot; and

(ii) transmits TX information to the base station and the secondary station on the selected frequency in respective ones of said n assigned transmit slots, the receiver receiving base station synchronization information to synchronize a transmit and reception timing of the telecommunication station to the base station; and

a receiver which receives RX information from the base station and the secondary station on the selected frequency in respective ones of said n assigned reception slots and receives synchronization information from the base station, the receiver receiving base station synchronization information to synchronize a transmit and reception timing of the telecommunication station to the base station

wherein using the telecommunication station for communications between the base station and secondary station is transparent to the base station and secondary station, and the

telecommunication ~~primary~~ station and the secondary station itself detects a frame timing from received signals and aligns its transmitting frame timing accordingly; and

each of said plurality of secondary stations finds the transmissions and slots assigned to that secondary station.

~~9.~~
16. A telecommunication system comprising the telecommunication station of claim 15 and a secondary station which includes:

(i) a secondary station receiver which receives the synchronization information from said telecommunication station, identifies the assignment of time slots on said selected frequency, and receives the TX information on the selected frequency in a respective one of said assigned transmit slots; and

(ii) a secondary station transmitter which transmits a signal carrying the corresponding RX information of m duplex telephonic communications on the selected frequency in m of said assigned reception slots.

~~10.~~
17. A telecommunication station according to claim 15 wherein the secondary station is a subscriber unit which is positioned outside a communicating range of said base station at a remote location whereat direct communication with said base station can not be made.

~~11.~~
18. A telecommunication station according to claim 15 wherein said transmitter and receiver are embodied in a radio.

~~15.~~
19. A telecommunication station for communicating with a base station and a secondary station using wireless transmissions, the base station communicating with a plurality of stations, the telecommunication station comprising:

a transmitter which:

(i) transmits telecommunication station synchronization information including the assignment of fixed periodic time slots to a plurality of subscriber units including the secondary station on a selected frequency, at least two fixed periodic transmit time slots for transmission from said telecommunication station and at least two fixed periodic reception time slots for reception by said telecommunication station, wherein the telecommunication station synchronization information enables a transmit and receive timing of the secondary station to be synchronized to the telecommunication station, said assignment of time slots resulting in each of said plurality of subscriber units assigned a separable slot; and

(ii) transmits a signal carrying information received from the base station on the selected frequency in a first assigned transmit slot and carrying information received from the secondary station on the selected frequency in a second assigned transmit slot; and

a receiver which:

(i) receives the information transmitted from the base station on the selected frequency in a first assigned reception slot and base station synchronization information from the base station, wherein a timing of the secondary station is synchronized to the telecommunication station using the telecommunication station synchronization information; and

(ii) receives the information transmitted from the secondary station on the selected frequency in a second assigned reception slot; and

(iii) each of said plurality of subscriber units ~~secondary stations~~ finds the transmissions and slots assigned to that subscriber unit ~~secondary station~~;

wherein using the telecommunication station for communications between the base station and secondary station is transparent to the base station and secondary station, and the telecommunication ~~primary~~ station and the secondary station itself detects a frame timing from received signals and aligns its transmitting frame timing accordingly.

~~16~~
~~20.~~ A telecommunication station according to claim ~~19~~ wherein the secondary station is positioned outside a communicating range of said base station at a remote location whereat direct communication with said base station can not be made.

~~17~~
~~21.~~ A telecommunication station according to claim ~~19~~ wherein said transmitter and receiver are embodied in a radio.

~~4~~
~~22.~~ A telecommunication system according to claim ~~11~~ wherein the secondary station is one of a plurality of secondary stations and the primary station communicates between each of the plurality of secondary stations and the base station using a plurality of available frequencies including the selected frequency.

~~5~~
~~23.~~ A telecommunication system according to claim ~~22~~ wherein each available frequency has a same time slot format and time synchronization as the selected frequency.

~~6~~
~~25.~~ A telecommunication system according to claim ~~11~~ wherein the primary station.

~~12~~
~~26.~~ A telecommunication station according to claim ~~15~~ wherein the secondary station is one of a plurality of secondary stations and the telecommunication station communicates between each of the plurality of secondary stations and the base station using a plurality of available frequencies including the selected frequency.

¹³
~~27.~~ A telecommunication station according to claim ¹²~~26~~ wherein each available frequency has a same time slot format and time synchronization as the selected frequency.

¹⁹
~~29.~~ A telecommunication station according to claim ⁸~~15~~ wherein the telecommunication ~~primary~~ station equalizes base station communications prior to retransmission to the secondary station.

¹⁸
~~30.~~ A telecommunication station according to claim ¹⁵~~19~~ wherein:
the secondary station is one of a plurality of secondary stations and the telecommunication station communicates between each of the plurality of secondary stations and the base station using a plurality of available frequencies including the selected frequency; and
each available frequency has a same time slot and time synchronization as the selected frequency.

¹⁹
~~31.~~ A telecommunication station according to claim ¹⁵~~19~~ wherein the telecommunication ~~primary~~ station equalizes base station communications prior to retransmission to the secondary station.

²
~~32.~~ A telecommunication system according to claim ¹~~11~~ wherein the secondary station is capable of receiving the base station synchronization information and synchronizing to the base station.